

REMARKS

Claims 1-17 and 50 were examined in the Final Office Action mailed May 30, 2007, with claims 18-49 standing withdrawn pursuant to Election/Restriction Requirement.

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Dr. Beers' U.S. Patent No. 5,628,960 ("Beer '960").

Claim 50 stands rejected under § 103(a) as unpatentable over Beer '960, in view of U.S. Patent No. 5,826,129 to Hasebe, *et al.* ("Hasebe").

The Applicants have carefully considered the remarks in the May 30, 2007 Final Office Action, and respectfully request reconsideration of the pending rejections in view of the following.

The Present Invention: The Applicants have set forth in their prior responses, and with the support of inventor declarations, how the present invention takes a radically different approach to preparation of the recited membranes than the prior art approach, and the superior results obtained as a result of this approach. Specifically, Dr. Beer identified the prior art membrane formation process required the use of costly, highly refined membrane feedstock materials to obtain low-contaminant (low "filter dust") membrane product.

Dr. Beer further explained that high-purity feedstocks were used because it was conventionally believed that it was essentially impossible to adequately remove filter dust from a wet membrane without unacceptably damaging the membrane. Contrary to the conventional "purify before forming membrane" approach, the Applicants succeeded in developing a membrane-formation approach in which a

membrane is formed from less highly refined (and thus significantly less costly) feedstocks after discovering that such a membrane could be satisfactorily cleaned while the partially-dried membrane was still wet (again, contrary to the conventional belief that dust could not be removed from a wet membrane without unacceptable injury to the membrane).

The Beer '960 Reference. Dr. Beer's '960 patent takes a fundamentally different approach to membrane formation than the present invention. In Beer '960, the formation of filter dust is avoided to a substantial extent by using cellulose materials for the production of the casting dope, which do almost not contain any short chain filter dust-forming cellulose materials. Thus, in Beer '960, *the cellulose materials are recrystallized before producing the casting dope.* As already explained in detail, the process according to the present invention comprises the step of removing filter dust from a membrane *after the membrane has been formed and before drying*, and does not require a recrystallization of cellulose materials at all.

Contrary to any suggestion that it would have been obvious to clean a membrane after it was formed, as previously noted the Applicants determined demonstrated that a removal of filter dust from a membrane after drying in fact does not lead to advantageous membranes where recrystallization of the cellulose starting materials was not previously performed. This is for precisely the reasons that the conventional view held that an approach such as the present invention would not work – *i.e.*, the dried membranes prepared from unpurified feedstocks suffered from the problems of inability to remove a sufficient amount

of filter dust from the dried membrane, and/or developing excessive mechanical defects in the dried membrane surface due to brushing. These mechanical defects of the membrane surface (e.g., irregular grooves which are caused by severe brushing) lead to unsharp, non-uniform and non-reproducible dividing lines when applying these membranes as diagnostic membranes (cf. the declaration of Dr. Beer of February 2, 2006, ¶ 9). Thus, in the absence of any teaching or suggestion in Beer '960's purified feedstock approach of the present invention's membrane formation followed by cleaning of the partially-dried membrane, Beer '960 does not provide any teaching or suggestion toward the invention recited in independent claims 1, 17 and 50.

The Hasebe Reference. For its part, the newly cited Hasebe reference does not render mechanical brushing and water rinsing of the claimed partially-dried membrane.

As a threshold matter, Hasebe teaches semiconductor surface cleaning – about as non-analogous to the field of delicate membrane processing that can be imagined. No one of ordinary skill in the art would even begin to consider looking in this field as possibly teaching anything regarding membrane processing.

Hasebe addresses cleaning of tightly-adhering impurities from the hard and smooth surfaces of metals or silicon wafers prior to coating in the harsh environment of semiconductor manufacture. These impurities consist of particles which have been deposited in an isolated manner on the silicon surface under extreme purity conditions of semiconductor production. The Hasebe

purification is carried out in two steps, namely in a purifying unit 2 with a brush and subsequently in a high pressure purifying unit 3 with water. *See, e.g.*, Hasebe at 1:21-23.

The membranes of the instant art do not have smooth, and by no means hard, surfaces, and thus would not be able to withstand the aggressive brushing taught by Hasebe. Moreover, Hasebe only addresses surface cleaning, whereas filter dust does not only exist on the surface of the membrane, but primarily is located within the pores in the pore layers which are adjacent to the membrane surface – places Hasebe's brushing simply would not address. The subject membranes are also very sensitive products, made of polymeric materials having pore walls and pore wall forming parts which are smaller than 0.01 μm , and thus are mechanically very sensitive. A person skilled in the art in the field of membranes accordingly would not consider the use of brushes and high pressure purifying means as suggested in Hasebe, as this would clearly destroy the membrane structure.

As a final point, the Applicants note that one of ordinary skill in the art further would not have considered applying Hasebe's brushing and high pressure cleaning techniques to the present partially-dried membrane, as one of ordinary skill would immediately recognize the need to avoid *any* such aggressive mechanical contact with the as-yet-not-solidified membrane when it is still in such a sensitive state.

In view of the foregoing, the Applicants request reconsideration and withdrawal of the rejection of claim 50 based on the Hasebe reference.

The Adequacy of Dr. Beer's Declaration. In response to the remarks at page 3 of the Final Office Action regarding the need for the Declaration to be commensurate in scope with the claimed subject matter, and the comment that the specification did not teach use of sodium alkyl sulfonate, the Applicants respectfully draw the Examiner's attention to the support provided in the Declaration and the Specification.

The Applicants submit that of claim 1's "preparing a feedstock membrane from a cellulose membrane casting solution by phase inversion in an evaporation process" is sufficiently supported in the declaration of September 28, 2006. For example:

"... preparation of the casting dope for each membrane ... different only in the use of refined vs. unrefined feedstock materials, otherwise having numerically identical ratios of CN components, methyl acetate, isopropanol, cellulose acetate, sodium alkyl sulfonate and water."

September 28, 2006 Declaration ¶ 6.

"... the casting dope samples were then cast in an identical manner by an evaporation process ... with identical wet film thickness, environmental conditions and belt temperature and speed."

Id. ¶ 7.

"... but before all the solvent has been evaporated, ..."

Id. ¶ 3 (specifically, at page 2, line 5).

The Applicants further submit that the September 28, 2006 Declaration also sufficiently supports claim 1's limitation of "prior to drying ... removing filter dust impurities..." The table attached to the Declaration describes on page 2 that a mechanical treatment of the upper surface of the membrane with a

rotating brush while rinsing with water under determined conditions prior to drying the membrane, as identified in the last line of the table (describing the drying of membrane after the filter dust removal).

With further regard to the sodium alkyl sulfonate use, it is noted that the impregnation with sodium alkyl sulfonate can be found, *e.g.*, in the original Specification: (for the Examiner's convenience, the following refer to the paragraph numbers in the U.S. publication of the present application, Publication No. 2002/0119577 A1):

"The membrane is impregnated in the second rinsing device with a 0.01 to 1.5% solution of an anionic wetting agent." [sodium alkyl sulfonate is an anionic wetting agent.]

Specification ¶ [0059] (for the Examiner's convenience, reference is made to the paragraph numbers in the U.S. publication of the present application, Publication No. 2002/0119577 A1). Additional text references are also found at Specification ¶¶ [0033]-[0036], [0046], and [0055] ("additives").

As can be taken from the Table as attached to Dr. Beer's Declaration, the casting dope for the membranes contains sodium alkyl sulfonate. When mechanically treating (brushing) under rinsing for removing filter dust, a part of the sodium alkyl sulfonate is washed out. Since this rinsing is not performed with the Beer '960 membranes, no corresponding conditions with respect to the contents of wetting agents would be obtained in the tests of the membranes. In order to obtain test results under comparable conditions, the wetting agent had to be added in the last rinsing step before drying.

The Equivalency “Casting Dope” and “Phase Inversion”. With regard to the request to demonstrate that the “casting dope and “phase inversion” are equivalent, the Applicants respectfully submit that the remarks at page 14 of the March 12, 2007 response have been misinterpreted.

In the declaration of Dr. Beer, it is mentioned unambiguously that “the casting dope samples were then cast in an identical manner by an evaporation process ... with identical wet film thickness, environmental conditions and belt temperature and speed.” September 28, 2006 Declaration ¶ 7. In Dr. Beer’s Declaration, he described how a preferred embodiment of the invention was reworked (removing filter dust by brushing while rinsing before drying the membrane). The Specification, however, mentions further measures which may lead to an efficient removal of filter dust. Accordingly, the Applicants respectfully submit that restricting the scope of the claims to only one preferred embodiment would not be appropriate in the present case.

CONCLUSION

In view of the forgoing remarks, the Applicants respectfully submit that claims 1-17 and 50 are allowable over the Beer ‘960 and/or Hasebe references. Reconsideration and withdrawal of the pending § 103(a) rejections, and issuance of a Notice of Allowance for these claims is respectfully requested.

If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

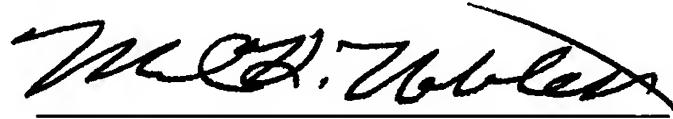
If necessary to effect a timely response, this paper should be considered as

Serial No. 10/051,459
Attorney Docket No. 010743.50685US
PATENT

a petition for an Extension of Time sufficient to effect a timely response, and
please charge any deficiency in fees or credit any overpayments to Deposit
Account No. 05-1323 (Docket # 010743.50685).

Respectfully submitted,

August 30, 2007



J. D. Evans
Registration No. 26,269
Mark H. Neblett
Registration No. 42,028

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844